



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/646,039	09/13/2000	Frank Uldall Leonhard	859-105P	3790

2292 7590 03/11/2005

BIRCH STEWART KOLASCH & BIRCH  
PO BOX 747  
FALLS CHURCH, VA 22040-0747

EXAMINER

KNEPPER, DAVID D

ART UNIT PAPER NUMBER

2654

DATE MAILED: 03/11/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

**Application No.**

09/646,039

**Applicant(s)**

LEONHARD, FRANK ULDALL

**Examiner**

David D. Knepper

**Art Unit**

2654

**-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --**  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 29 September 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-18 and 23-32 is/are pending in the application.
- 4a) Of the above claim(s) 23-32 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-18 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 29 September 2004 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_

1. Applicant's correspondence filed on 29 Sep 2004 has been received and considered. Claims 1-18 and 23-32 are pending.
2. 13 sep 2000 and 13 Oct 2000 (IDS papers #3 and IDS paper #4) has been received and considered. The references were considered but both repetitious listings were accidentally marked as having some references lined through that were considered. Unfortunately, no clean copy is available after the file was converted to IFW (Image File Wrapper) so the applicant is asked to provide a clean copy that can be properly marked by the Examiner to correct the record. The Examiner could print out a lined-through copy and apply correction fluid but the result may not be legible and could cause more confusion.

#### **New Matter**

3. The amendment filed 29 September 2004 is objected to under 35 U.S.C. 132 because it introduces new matter into the disclosure. 35 U.S.C. 132 states that no amendment shall introduce new matter into the disclosure of the invention. The added material which is not supported by the original disclosure is as follows: the new figure 13 and the amendments to pages 13 and 22 of the specification refer to inaccurate information or adds material that did not exist in the original application. Page 12 of the specification has no reference to --figure 1-- nor does it mention a --signal processor-- related to the new paragraph that the applicant wants to add following an equation on page 13, line 23. The amended paragraph referenced by the applicant as appearing on page 22, line 28 appears on page 23, line 15 referring to a --transient (envelope) signal--. However, the filter bank present in the original figure 13 shows  $i(t)$  as input and the following paragraph (page 23, line 19) indicates that the  $h_1(t) \dots h_n(t)$  are the filters of the filter

bank as opposed to the ones numbered 26 in the amendment. Since the input  $i(t)$  is not clearly defined, it may be difficult to make sense out of the true intent of figure 13.

Applicant is required to cancel the new matter in the reply to this Office Action.

4. Newly submitted claims 23-32 are directed to an invention that is independent or distinct from the invention originally claimed for the following reasons: These claims are directed to a frequency-bandwidth analysis but the originally presented claims are limited to a short-time transform (a Laplace transform) that represent transient sounds. The bands described in original claims 14-17 do not describe the bandwidth of the sound but the bandwidth of the digital transmission as opposed to any processing of a sound signal. While claim 18 now is related to sound, the original claim 18 was not so limited and therefore, the bands represented nothing but a mathematical exercise.

Claims 23-32 fail to provide any analysis for detecting or analyzing "transients" related to the other claims. Thus, the evidence provided by the claims indicates that the bandwidth analysis of sound (claims 23-32) would provide typical steady state (pitch or frequency related) sound models opposed to a transient analysis of claims 1-18.

5. Since applicant has received an action on the merits for the originally presented invention, this invention has been constructively elected by original presentation for prosecution on the merits. Accordingly, claims 23-32 are withdrawn from consideration as being directed to a non-elected invention. See 37 CFR 1.142(b) and MPEP § 821.03.

6. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

7. Claims 1-18 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claims contain subject matter, which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. The original claims were not drawn to “a transient in a sound signal”. Although this is apparently what the disclosure discusses, it does not reasonably explain how a simple equation is magically able to isolate or otherwise limit sound to nothing but transients as claimed in claim 1 (and dependent claims 2-18).

More importantly, the “transient in a sound signal” (claim 1) is not clearly defined in such a way that the equation and claims can have any chance of isolating them. A transient, would, in general, represent something that passes quickly in and out of existence. Thus, it would be imperative to know precisely what measurements or features would define such a signal. The applicant’s specification is devoid of any detailed definition of transient sounds or detection thereof, which would reasonably convey detection, and/or analysis of such sounds. The specification on page 6 states, “The transient terms are seen as transient pulses in the speech signal. The rise time and the shape of leading and lagging edges of the envelope of transient pulses in the terms of a profile of damped frequencies describe the sound picture. The shape of the leading and lagging edges, the dynamic changes, change of amplitude, of the transient pulses, voiced/unvoiced detection and the changes of pitch are decisive for speech recognition...”

Page 9 of the specification states, "...the term 'transient pulse' refers to a pulse having a distinct shape and substantially holding the information of the transient component of the auditory signal..."

The above sections from pages 6 and 9 of the specification indicate that a variety of measurements are needed to describe a transient, which include: "rise time", "shape of leading and lagging edges of the envelope", "dynamic changes" and "change of amplitude." Page 9 indicates that a "pulse having a distinct shape" must be isolated having some specific change in amplitude over time. These measurements appear to represent specific signals but do not represent a generic equation such as shown in claim 1. The conditions and/or measurements under which a desired input would represent a transient sound simply do not exist in the claims. The specific measurements of these parameters necessary to isolate or detect transients are not provided.

Claims 12-18 indicate that the signal according to claim 1 is auditory and may be processed, transmitted and received. However, the claims fail to recite the necessary structure or steps capable of converting to or from an equation to sound. None of the claims provide specific parameters for transmission.

The claims should describe the steps necessary to achieve the desired processing and/or conversion of input into other parameters. No convolutions indicative of a filtering function are present in the claims. Thus, the desired result of filtering is not supported.

The input of claim 1, for example, is given as "a transient in a sound signal". However, the only step is a single equation, which includes a variable  $v_i$  stated as "the sound signal". The applicant fails to support input that is limited to "a transient in a sound signal" while also

providing a generic equation, which may process any sound signal. Processing steps necessary for analyzing sound and detecting a transient are absent from the claims. These steps also appear to be absent from the specification, which merely provides some mathematical background and concludes on pages 25-26 with a laundry list of desired results to which someone might be able to develop a practical application if they can isolate transient responses using the mathematical background provided.

The steps necessary to achieve a practical application of the mathematical background discussed in the specification have not been provided.

### **Drawings**

8. The drawings are objected to because none of the figures correspond to the claims. The drawings may illustrate certain shapes and representative parameters but these are not present in the claims in such a way that any meaningful relationship may be established between claim elements and elements of the drawings. For example, claim 1 indicates no particular input but implies that sound has been limited to a particular transient which can then be applied to a generic equation. However, the drawings do not show input transient sound nor any particular steps or apparatus for collecting a transient in a sound signal. Figure 1 labels the input parameter as sound but no description of providing a transient is apparent.

New figure 13 is objected to as new matter. The original drawing did not label the input as sound. This objection to the drawing is also considered pertinent to the rejection under 35 USC 112, first paragraph.

Correction is required.

### **Specification**

9. The disclosure is objected to because of the following informalities: Figure 1 shows nothing but a black box. The description supports this figure with nothing more than equation (1) on page 12 which indicates that any invention supported by this figure is purely mathematical. A figure is needed to show that the equation may be applied in some way to a particular use or physical transformation of data such as speech. Figure 1 shows sound input but does not show any processing related to the variables stated in the claims. The black box shows  $h(t)$  which does not appear anywhere in the claims indicating that the applicant has deliberately avoided any useful illustration of what is being claimed. The output of figure 1 has no apparent relationship to anything claimed.

The drawing numbers do not relate any of the figures to the claims. Therefore the claimed equation does not appear to have any correlation to the invention shown in the drawings. This objection to the drawing is also considered pertinent to the rejection under 35 USC 112, first paragraph.

Appropriate correction is required.

### **Claims**

10. **35 U.S.C. § 101 reads as follows:**

"Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter or any new and useful improvement thereof, may obtain a patent therefore, subject to the conditions and requirements of this title".



11. Claims 1-12 are rejected under 35 U.S.C. § 101 because the claimed invention is directed to non-statutory subject matter.

The following analysis is made in accordance with the Computer-Implemented Invention Guidelines (see MPEP 2106).

**12. Identify and Understand Any Practical Application Asserted for the Invention**

The specification does teach that the invention may be applied to a practical application. The equation of claim 1 is referenced in the specification as having a particular use for the analysis of transients if used to analyze speech data.

**13. Review the Detailed Disclosure and Specific Embodiments of the Invention to Determine What the Applicant Has Invented**

The specification as a whole indicates that the invention is directed towards analyzing speech to detect transients. The analysis above was performed in order to point out what practical application is taught by the specification for using the claimed calculations.

It is assumed that implementation is possible on any programmed computer. No particular drawing is shown to describe the particular hardware of the system or group of components which perform the claimed calculations or software. No particular hardware component is described in the specification for implementing the equations which enable the claim limitations. Figure 1 is a black box with no designation that would support the particular application that is suggested in the specification.

**14. Review the Claims**

The subject matter of a properly construed claim is defined by the terms that limit its scope. It is this subject matter that must be examined. As a general matter, the grammar and intended meaning of terms used in a claim will dictate whether the language limits the claim scope.

The claimed device is directed towards “analyzing a transient in a sound signal” (claim 1). However, the claim then recites a generic Laplace transform equation which performs no analysis of sound capable of predicting, isolating nor in any way “analyzing” a transient in a sound signal. To the contrary, the mere recitation of an equation presents a mathematical description of any sound signal having a periodic function regardless of actual content. While the preamble of the claim refers to “a transient in a sound signal”, the body of the claim indicates that the input is “sound” but the output is a mere number “L” thus defeating the normal safe harbor that would indicate a physical act outside the computer.

The step “in accordance with...” the equation indicates the disclosed equation of page 25, or any functionally equivalent equation.

Claim 2 suggests a filtering step but fails to provide any reasonable description of convolution or other necessary steps or apparatus capable of actually filtering some meaningful information by inclusion or exclusion from sound.

Similarly, claim 3 merely states another desired result of somehow combining undefined “steps of transforming the signal  $v_i$  for a plurality of sets of  $\sigma$  and  $\omega$  values” without specifying the transformation, the sets of values, nor the desired result of the outcomes of any of the steps.

Claim 4 similarly fails to recite any meaningful signal processing. It merely indicates that one transformed signal will be somehow processed to determine a maximum.

A search of the prior art was conducted.

**15. Consider the Breadth of 35 USC §101 Under Controlling Law**

Federal courts have held that §101 has certain limits. The phrase “anything under the sun that is made by man” is limited by the text of §101, meaning that one may only patent something that is a machine, manufacture, composition of matter or a process.<sup>1</sup>

---

<sup>1</sup>See, e.g., Alappat, 33 F.3d at 1542, 31 USPQ2d at 1556 (Fed. Cir. 1994); In re Warmerdam, 33 F.3d 1354, 1358, 31 USPQ2d 1754, 1757 (Fed. Cir. 1994).

The subject matter courts have found to be outside the four statutory categories of invention is limited to abstract ideas, laws of nature and natural phenomena. These three exclusions recognize that subject matter that is not a practical application or use of an idea, a law of nature or a natural phenomenon is not patentable.<sup>2</sup>

**16. Classify the Claimed Invention as to Its Proper Statutory Category**

In this case, the invention as set forth in the written description is statutory, but the claims define subject matter that is not. The features of the invention that would render the claimed subject matter statutory if recited in the claim is to include speech input to the system such that it is converted in form to the desired data. This would place the claims into a so called "safe harbor" by requiring a physical act outside a computer (the physical input of speech and subsequent change of physical attributes thereof).

Another option would be to add limitations which indicate the practical use of the resultant data in an overall system.

**17. Nonstatutory Process Claims**

A claimed process that consists solely of mathematical operations is nonstatutory whether or not it is performed on a computer.

Claims 1-12 fall into this nonstatutory class because they rely solely on the equation disclosed on page 25 and do not apply to any particular physical data or to a particular application.

---

<sup>2</sup>See, e.g., Rubber-Tip Pencil co. v. Howard, 87 U.S. 498, 507 (1874) ("idea of itself is not patentable, but a new device by which it may be made practically useful is"); Mackay Radio & Telegraph Co. v. Radio Corp. of America, 306 U.S. 86, 94 (1939) ("While a scientific truth, or the mathematical expression of it is not a patentable invention, a novel and useful structure created with the aid of knowledge of scientific truth may be."); In re Warmerdam, 33 F.3d at 1360, 31 USPQ2d at 1759 ("steps of 'locating' a medial axis, and 'creating' a bubble hierarchy . . . describe nothing more than the manipulation of basic mathematical constructs, the paradigmatic 'abstract idea'").

**18. Statutory Subject Matter**

A machine is: a concrete thing, consisting of parts or of certain devices and combinations of devices. *Burr v. Duryee*, 68 U.S. (1 Wall.) 531, 570 (1863).

**19. Statutory Process Claims**

Claims 13-18 appear to fall into this statutory class because they are directed to a safe harbor by transforming the data into actual sound that may be heard by an animal ear. The data to be stored and converted is specified as limited to “transient pulse shapes perceived by an animal ear such as a human ear...”. These claims indicate that particular pulse shapes may be defined as differentiable sounds by a user as defined on page 24, lines 15-17 when they happen to represent “the vowels ‘a’, ‘o’, ‘i’ in ‘hard key’ and ‘soft key’ pronounced by a female and a male.” Because vowel sounds are known as steady state sounds having pitch, opposed to sibilants, diphthongs, semi-vowels, labials and others with greater variation (transients), it is not obvious to utilize shapes, which are limited to transients to produce these sounds. Unfortunately, this also creates a contradiction in the claims regarding the limitation of transients as opposed to vowel sounds.

**20. Conclusion**

In view of the above analysis, the claimed subject matter of claims 1-12 is non-statutory because they consist solely of producing output labeled with mathematical. It is noted that the claimed practical application or “safe harbor” is not supported as required under 35 USC 112, first paragraph.

**21.** Claims 1-4, 7, 8 and 12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nyack (Laplace Transform Definition) in view of Scarr (3,573,612).

As per claim 1, short time transforming the signal... (taught by the definition by Nyack which not only shows the same form of the equation claimed but also explicitly teaches that the Laplace Transform is well suited for describing systems with initial values and transients.)

It is noted that Nyack does not explicitly address whether the Laplace Transform can be applied to speech signal processing. However, Scarr clearly teaches that one of ordinary skill in the art of speech signal processing knows that the Laplace transform are useful in going from the frequency domain to the time domain in order to obtain, for example, the transient response of a specified circuit, in column 1, lines 29-40. Therefore, it would have been obvious to one of ordinary skill in the art to apply a Laplace transform to speech in order to obtain the transient response because one of ordinary skill in the art of speech signal processing would be familiar with mathematics and how to apply it as needed to solve problems as suggested above for at least two reasons. First, the definition itself suggests that any competent engineer or scientist should use it to describe systems with transients and it is common knowledge that speech exhibits transient behavior. Second, Scarr explicitly teaches that the Laplace transform is useful to obtain the transient response of speech and provides some explanatory details about speech that those of ordinary skill in the art would find trivial regarding transitions and steady state response.

Claim 2: The mathematics for a 2-pole complex conjugate as claimed is clearly shown as a well-known mathematical implementation of the Laplace transform available on the Internet (<http://cnyack.homestead.com/files/alaplace/laptr2.htm>).

Claim 3: Transforming the signal  $v_i$  applied using complex conjugates is obvious as noted under claim 2 and further in view of the listing of other values that can be readily seen as

listed on page 3 of Nyack under Laplace Transform as shown on the 4-page print-out from <http://cnyack.homestead.com/files/idxpages.htm>.

Claims 4, 7, 8 and 12 towards basic parameters are rejected under similar arguments as applied to claims 1-3 above.

22. Claims 5, 6, 9-11 and 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nyack (Laplace Transform Definition) and Scarr (3,573,612) as applied to claims 1-4, 7, 8 and 12 above in further view of Kellet (4,343,969).

It is noted that Nyack and Scarr do not teach “comparing” signals nor do they explicitly teach selecting from the group of “filtering, rectification, differentiation, integration and amplification”. However, Kellet explicitly teaches that it is well known to use specific frequency based (filtered) parameters in order to perform comparisons (see his figure 1, item 22). His Table 1 on columns 10-11 shows specific details for these parameters and column 10, lines 41-46 teaches that it is well known to provide library functions such as stored lexicon and dictionary to perform identification of words and phrases. Thus, it would have been obvious to develop specific parameters because Kellet teaches that this is necessary to perform speech recognition. While Kellet teaches the use of Fourier transforms (col. 13), he recognizes the alternate use of Laplace transformation methods in col. 1, line 64 and that Nyack and Scarr teach that it is obvious to substitute Laplace transform for Fourier because the Laplace transform is preferred to provide better analysis for transients as previously noted (see especially Scarr, col. 1, lines 22-34).

23. The incorporation of essential material in the specification by reference to a foreign application or patent, or to a publication is improper. Applicant is required to amend the disclosure to include the material incorporated by reference. The amendment must be accompanied by a statement executed by the applicant, or a practitioner representing the applicant, stating that the material being inserted is the material previously incorporated by reference and that the amendment contains no new matter. 37 CFR 1.57(f).

24. Some correspondence may be submitted electronically. See the Office's Internet Web site <http://www.uspto.gov> for additional information.

Please address mail to be delivered by the United States Postal Service (USPS) as follows:

Mail Stop \_\_\_\_\_  
Commissioner for Patents  
P.O. Box 1450  
Alexandria, VA 22313-1450

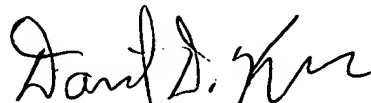
Fax phone number for Group 2600 is (703) 872-9306

25. Any inquiry concerning this communication or earlier communications from the examiner should be directed to David D. Knepper whose telephone number is (703) 305-9644. After 28 March 2005, the examiner's phone number will be (571) 272-7607. The examiner can normally be reached on Monday-Thursday from 07:30 a.m.-6:00 p.m.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Richemond Dorvil, can be reached on (703) 305-9645. After 28 March 2005, the examiner's supervisor's phone number will be (571) 272-7602.

For the Group 2600 receptionist or customer service call (571) 272-2600.

For general questions to the USPTO, you may call **800-786-9199** (IN USA OR CANADA) or **703-308-4357** for assistance from Customer Service Representatives and/or access to the automated information message system. TTY customers can dial **703-305-7785** for customer assistance.

A handwritten signature in black ink, appearing to read "David D. Knepper". The signature is fluid and cursive, with a large initial "D" and a stylized "K".

David D. Knepper  
Primary Examiner

**Art Unit 2654**

March 7, 2005